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Description
Heat carrier for low temperatures the invention relates to the use of an hydrocarbon as heat carriers.

In the chemical and pharmaceutical industry frequent methods become performed, whose temperature in a very far temperature range must become adjusted. Keeping at a moderate temperature the apparatus or the process unit made by means of a Wärmeübertragungsanlage, or several cool. and/or. Warm cycles contains, becomes a guided in which or several heat carrier. The heat carrier is umgepumpt in an heat exchanger the corresponding desired process temperature cooled and/or in a second heat exchanger heated and in the apparatus or the process unit contained circuit.

As heat carriers synthetic oils become usually used. Since the melting point of the synthetic oils does not rise low enough ist-minimal-110 C-and the viscosity of the synthetic oils with low temperatures to in such a way high values that these no more cannot be umgepumpt, synthetic oils are on the insert portion above etwa-95 C limited.

From the DE 42 40 306 C2 is the use of Methylcyclopentan known as heat carriers. Due to the low melting point and the fact that the viscosity of this Mediums increases only slight one with low temperatures, it finds Methylcyclopentan in the temperature range bis-130 C as heat carrier use.

Object of instant invention is it to find a fabric who can become also still liquid with low temperatures as heat carrier used and also with high temperatures is.

This object becomes according to invention that a not-cyclic, dissolved by the fact, at least five carbon atoms contained hydrocarbon becomes with a temperature zwischen-150 C and + 120 C as heat carrier used.

Surprisingly shown has itself that not-cyclic, at least five carbon atoms contained hydrocarbons excellent heat distribution medium characteristics to possess. These hydrocarbons are more insertable due to their Schmelz-und of boiling points and their also in the vicinity of the respective melting points low viscosity in a far temperature range as heat carriers.

Besides the hydrocarbons possess relative high specific heat capacities, so that the transmission of a predetermined thermal output a relative small heat distribution medium river must become adjusted.

So far it was necessary to use several heat carriers if the temperature in a large temperature range had to become varied. With the help of the hydrocarbons mentioned it is now possible to cover a temperature range between etwa150 C and over 100 C with a single heat carrier.

Preferably hydrocarbons with five or six carbon atoms, particularly prefered 3-Methylpentan, 2-Methylpentan or ISO hexane, 1,5-Hexadien or 1-Hexen, as heat carriers become used. Thus for example the latter compounds bei-110 C possess a viscosity, which lies around a factor 2 to 4 below the viscosity of Methylcyclopentan. The Schmelzpunkte of these Mediums is lower up to 20K as from Methylcyclopentan.

The heat carriers according to invention are to with temperatures a zwischen50 C und-130 C due to their small toughness lighter umpumpbar as the known heat carriers, on the other hand are more insertable them in the temperature range below von-130 C, in which so far none were as heat carriers suitable Mediums known.

The heat carriers according to invention are also still more insertable over +120 C in a large temperature range between etwa-150 C and +120 C and bottom use of special measures. The particular advantages of the invention, i.e. the low viscosity and the low melting point of the hydrocarbons, show up however in particular with low temperatures zwischen-150 C und-100 C.

However even with higher temperatures for example to 120 C and over it not-cyclic, at least five carbon atoms are suitable contained hydrocarbons excellent than heat carriers. Preferably the upper temperature limit predetermined by the boiling point becomes shifted by application of the heat carrier with a pressure between 1 bar and 5 bar, preferably between 1,5 bar and 3,5 bar. In this way the boiling point of the heat carrier and thus its insert portion on temperatures can become from 120 C and more extended.

In the practice will the stressed hydrocarbons not to to the lower temperature limit cooled certain by the melting point, in order to avoid a partial or complete freezing of the hydrocarbons out. Preferably the hydrocarbon becomes with a temperature above 10 K, prefered 15 K, over its melting point used. With these temperatures a solidification of the hydrocarbon is excluded, which would pull a failure of the Wärmeübertragungsanlage.

The invention as well as other details of the invention become in the following more near explained on the basis the embodiment represented in the drawing. Here shows:
Fig a Wärmeübertragungsantage for keeping at a moderate temperature a chemical
Reactor.

In a reactor 1 chemical reactions performed, which make it for required to adjust in the reactor 1 temperatures zwischen-120 C and + 100 C, become.

For this the reactor 1 is kept at a moderate temperature with the help of an heat carrier led in the circuit. As heat carrier 3-Methylpentan becomes used.

The achievement of low temperatures the 3-Methylpentan in an heat exchanger becomes 2 against liquid nitrogen 3 cooled. The evaporating nitrogen becomes 4 withdrawn over line. The cooled down 3-Methylpentan kühit in indirect heat exchange the reactor 1 off. The heated heat carriers becomes then with the pump 5 again cooled back-pumped to the heat exchanger 2 and. The temperature of the reactor 1 becomes 2 controlled over the temperature of the heat carrier after the heat exchanger.

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To the heating of the reactor 1 on temperatures to 100 C a second heat exchanger is 7 switched into the circuit, becomes heated in which the 3-Methylpentan. Due to much the wide temperature range of more than 200 K, which will drive through from the heat carrier, it is necessary to attach to the heat distribution medium cycle an expansion container 8 in order to adjust the volume change of the heat carrier accompanying with the temperature change.